

*erythrina*, as figured by Burmeister, we have a parallel to the case of *Aglia tau*. The fully grown larva is smooth-bodied and without the four long large thoracic spines and the caudal horns on the eighth and ninth abdominal segments of the previous stage. The genus appears to belong to the Ceratocampidæ.

Although we are not yet acquainted with the early larval stages of *Endromis*, we do not see why the Sphingidæ may not have sprung from a form like this as much as from *Aglia*, as the shape and markings of the full-grown caterpillar are much nearer a typical *Sphinx* than those of *Aglia*. Moreover, taxonomically *Aglia* is by no means so "closely" allied to the Sphingidæ as Mr. Poulton in his able papers would lead us to infer. In its venation *Endromis* is much nearer, and the latter is a more generalized or synthetic form than *Aglia*. From the Ceratocampidæ the families of Saturniidæ and also of Hemileucidæ may have originated, and, indeed, all the Bombyces (unless we except the Arctians and Lithosiidæ) may have evolved before the Sphingidæ appeared. Judging by the characters of the head, the antennæ, thorax, and especially the venation, the Sphingidæ are far removed from the Ceratocampidæ, and their origin from the latter family was at least remote, and there must be some lost, extinct, annectant forms which originally connected them.

XXIV.—*Contributions towards a General History of the Marine Polyzoa, 1880-91.—Appendix.* By the Rev. THOMAS HINCKS, B.A., F.R.S.

[Continued from vol. ix. p. 334.]

'Annals,' February 1882 (p. 82 sep.).

*Steganoporella (Vincularia) Neozelanica*, Busk.

In a note on p. 85 (sep.) the last clause of the first paragraph should read thus:—"The latter is a *Membranipora*, the former belongs to a different family." The *Vincularia abyssicola* mentioned in this paragraph is the *Smittipora abyssicola* of Jullien, which he ranks in the family group of the Onychocellidæ\*.

The passage relating to the oœcium on the same page has been criticized by Dr. Jullien, who challenges the interpretation which I have given of the upper chamber in the zoœcia

\* Bulletin de la Société Zool. de France, t. vi. (1881).

of *Steganoporella* on the ground that no one has demonstrated the presence of reproductive bodies within it. This may be true, and may be easily explained. All the probabilities point to this interpretation as the true one. The Cheilostomata are generally furnished with external oœcia in which the embryos complete their development. These are wanting in *Steganoporella*, and it is reasonable to suppose that the internal chamber provided by the peculiar structure of the zoœcium may be the equivalent. Amongst the ordinary Cheilostomata species occur which are destitute of oœcia of the ordinary type; their function is discharged by specially modified zoœcia, which are commonly distinguished by the larger size and sometimes the altered shape of the orifice. In the case of *Steganoporella*, as Busk has pointed out\*, the upper or oœcial compartment is more developed in some of the zoœcia than in others, and the difference is marked by a difference in the size and pattern of the chitinous framework of the operculum. These structural variations throw light one on the other.

On p. 86 (sep.) a list has been given of the species belonging to the genus *Steganoporella*; but when it was prepared the structure of the group to which this genus belongs had not been thoroughly investigated, and important changes have since been made in the classification. The following table shows these changes:—Genus STEGANOPORELLA: Species *S. magnilabris*, *S. Neozelanica*. Genus THALAMOPORELLA, Hincks: Species *T. Rozieri*, Audouin, and its forms *gothica*, *Indica*, and *falcifera*; *T. Smittii*, Hincks; *T. Jervoisii*, Hincks; *T. steganoporoides*, Goldstein.

*Micropora elongata*, Hincks, and *M. perforata*, MacGillivray, were wrongly referred to *Steganoporella*. *Vincularia Novæ-Hollandiæ*, Goldstein, which was doubtfully included in *Steganoporella*, is *Thalamoporella Rozieri*, form *indica*, Hincks.

Ibid. (p. 86 sep.).

*Monoporella albicans*, sp. n.

Ibid. (p. 89 sep.).

*Schizoporella aperta*, sp. n.

The forms described under the above names agree in general character and in most of the details of structure; but as I was unable to detect an oral sinus in my specimen of the former, it seemed necessary to refer it to *Monoporella*, noting the remarkable similarity in other points between the two forms.

\* 'Challenger' Report, part i. p. 74.

I now believe that in the specimen (or specimens) on which *Monoporella albicans* was founded the sinus was not absent, but was entirely concealed by the suboral umbo, as it is, I find on reexamination, in many of the cells of the other form. *Monoporella albicans* therefore must merge in *Schizoporella aperta*.

‘Annals,’ August 1882 (p. 96 sep.).

*Euthyris obtecta*, sp. n.

The larger cells with modified orifice are now known to occur on many species and are no doubt subservient to reproduction. MacGillivray rightly refers *Carbasea* (*Flustra*) *episcopalis* to this genus; but he does not mention whether it possesses the two classes of cell.

‘Annals,’ March 1883 (p. 104 sep.).

STIRPARIA, Goldstein.

It may be a question, I think, whether this genus can be maintained. The erect segmented stem seems to be the one peculiarity which separates it from *Bicellaria* \*, with which it entirely agrees so far as the zoecial characters are concerned; and the morphology of this structural element has hardly been determined as yet with certainty. There is a close resemblance between the stem of *Stirparia* and that of the genus *Kinetoskias* of Koren and Danielssen, also a Bicellarian form.

Ibid. (p. 108 sep.).

Family Cellariidæ.

FARCIMIA, Pourtales.

*Farcimia appendiculata*, sp. n.

In a paper on “Tertiary Chilostomatous Bryozoa from New Zealand” † Mr. Waters has identified his *Membranipora articulata* ‡ with the present species, and expresses an opinion that if I had “decalcified” my specimens I should have taken the same view. Circumstances have prevented me from

\* Busk refers *Stirparia glabra* (mihi) to the genus *Bicellaria* (‘Challenger’ Report, part i. p. 35, pl. vi. fig. 1).

† Quart. Journ. Geol. Soc. for February 1887.

‡ “Fossil Chilostomatous Bryozoa from South Australia,” Quart. Journ. Geol. Soc., August 1882.

recurring to the subject before ; but after a careful reexamination, recently made, I still find myself quite unable to accept his conclusion. *Farcimia appendiculata*, when deprived of all its chitinous appendages and reduced, as far as possible, to the condition of the fossil, differs markedly from *Memb. articulata*, and in my judgment the differences are specific. If we compare the individual zoecia we can hardly fail to be struck by the points of contrast which they present and which are clearly shown in Mr. Waters's figures and in my own. In the first place there is a remarkable difference in the shape of the cells as well as in much of their detail. That of *M. articulata*, which is inclosed by a conspicuous raised boundary line (the "band" of Waters), is elongate and *hexagonal* in form. The zoecia are ranged in single file along each face of the quadrilateral stem, and are quite distinct, but are linked together by an extension of the marginal line given off from the summit of each cell. The *aperture* is comparatively small, occupying the upper two thirds of the area, narrow, with straight sides, rounded above and slightly incurved below. A calcareous lamina surrounds the aperture, closing in the space between it and the outer wall.

In *Farcimia appendiculata* the zoecia are elongate-oval, contracted above, so as to form a framework for the operculum, the extremities in contact or nearly so, the margin rather thin, sloping slightly outward and usually expanded at the base of the cell; the aperture occupying the whole of the area and closed in by a membranous covering; the orifice semi-circular, at the very top of the zoecium. There is some slight diversity in the shape of the cell, the regular oval giving place in many cases to a form which narrows off towards the top and expands considerably below; but in both conditions it is equally removed from that which characterizes the other species. The dissimilarity of the *apertures* in size and shape is very marked and significant, whilst the total absence of the raised boundary-line which surrounds the cells and links them together, and which in *M. articulata* gives its distinctive aspect to the colony, is strong evidence against specific identity. In the presence of such important zoecial differences I am fully justified in regarding the two forms under consideration as distinct species. I may add that a more searching method of investigation has only made these more apparent.

It is difficult to compare the avicularian appendages in the recent and fossil forms. Those of *F. appendiculata* are remarkable for their size and structure, and almost fill in the space between the lines of cells. Mr. Waters represents in his figure two very small pointed avicularia of the ordinary

form near the top of each zoëcium, placed one on each side and pointing downwards. There are no traces of anything more. The appendages of the *Farcimia* are remarkable for their size and are of a peculiar type.

In my previous description of this species I have referred to a structural similarity between its avicularia and those of *Scrupocellaria*; but more accurate observation has convinced me that there are most important differences between them. They consist of an elongate avicularian chamber, tapering slightly downward, convex in front, and adnate to the side of the cell a little below the oral extremity. The top (which is flattened) is occupied by the mandibular apparatus and carried out in front into a small beak-like process; the mandible is rounded. A raised calcareous margin surrounds the chamber (which is also calcareous), and the front is closed in by a chitinous covering. As I have mentioned, the space between the rows of cells is almost entirely occupied by the avicularian appendages.

The differences between *Farcimia appendiculata* and *Memb. articulata* as figured by Mr. Waters, which I have just described, can hardly be due to the changes which have taken place in the fossil. Traces of the large avicularian chamber, which is formed of calcareous material, must have survived, for this structure in the recent form, with the exception of its chitinous envelope, was not materially affected by incineration.

The oëcium in *F. appendiculata* is immersed, as it is in many of the *Flustræ*. In ovicelligerous cells the margin is not carried round the top, its place being taken by the oral arch of the oëcium; the latter occupies a small intercellular space. The oëcium is somewhat shallow, subglobular, the front occupied wholly by a large circular orifice facing the interior of the cell and probably closed by a membrane. Above the operculum of the cell, immediately under the oral arch of the oëcium, is a narrow slit-like opening through which the embryos escape.

In a previous description of this species\* I have referred to certain remarkable appendages which are distributed in large numbers over the zoarium. These consist of tall, erect, strap-like bodies, formed of shining membrane of a light brown colour, broad below and for a great part of their length, but tapering off abruptly within a short distance of the tip and terminating in a sharp point. They seem to be always connected in some way with the avicularium—sometimes

\* Ann. & Mag. Nat. Hist. for March 1883.

attached to the side of it, sometimes to the top also, as if to shield it from some danger. But we must have more definite knowledge than we now possess of the function of the avicularia themselves before we are likely to determine the precise office of the subsidiary appendages. It may be noted that the extremity of these curious organs is commonly bent downwards from a definite point.

I do not propose to discuss at any length the generic position of this very interesting form. It possesses characters which, I think, should separate it from *Membranipora*, and may probably be referred to the genus *Farcimia* of Pourtales\*, of which Smitt, in his 'Floridan Bryozoa' (part ii. p. 3), has given an interesting account, pointing out its distinctive peculiarities. The generic name, as he has remarked, was originally given by Fleming to a *Cellaria*, and is therefore a mere synonym available for further use.

Ibid. p. 109 (sep.).

*Schizoporella cinctipora*, sp. n.

Mr. Waters has described and figured a variety (*personata*) of this species † from New Zealand Tertiary beds. The differences, however, between the supposed varietal form and the recent *S. cinctipora* as figured seem to be so striking and important that I venture to question their specific identity.

Ibid. (p. 109 sep.).

*Lepralia foraminigera*, sp. n.

This species has also occurred in the New Zealand Tertiaries. Mr. Waters notes that only the two upper openings in the cell-wall occur in fossil specimens.

Ibid. (p. 110 sep.).

*Lepralia rectilineata*, sp. n.

This has also been found fossil in New Zealand. Waters mentions that there is "often a small ridge or boss at each side of the aperture, just below which there are two small avicularia." The oecium, which I had not met with, is described as "raised, globular, about half as wide as a zoecium."

\* Bull. Mus. Comp. Zool. Harvard Coll. Cambridge, no. 6, p. 110.

† Quart. Journ. Geol. Soc., Feb. 1887.



Ibid. (p. 110 sep.).

*Mucronella bicuspis*, sp. n.

This species is ranked by Waters as a variety of his *Smittia biincisa*\*. I have not had the opportunity of examining specimens of the fossil form, which was procured from Tertiary deposits in South Australia and New Zealand; but, judging from the figure, I can hardly think that there is sufficient ground for identifying it with *M. bicuspis*. The general character of the orifice seems to me to be very different in the two; the lateral avicularia, a very constant feature of the recent species, are wanting in the fossil, while the tubular avicularia which are so conspicuous a characteristic in the fossil are wanting in *M. bicuspis*. The oral denticle of the latter is peculiar; but Mr. Waters has noticed some variability in this portion of the structure.

The difference between the characters of the cell-wall in the two forms is remarkable. Not only are there *more* of the large pores in *S. biincisa*, but they differ in shape and arrangement from those of the recent species. They form a reticulate covering over the whole surface of the cell, whilst in *M. bicuspis* they are disposed in a single line running across the front of the cell. At the same time it must be admitted that the superficial character of the cell-wall is liable to much variation. Mr. Waters's experience as a student of fossil Polyzoa entitles his judgment to much respect in a case of this kind, and on the whole I prefer to leave the question an open one.

'Annals,' May 1884 (p. 358)†.

*Membranipora marginella*, sp. n.

Two of the four cells figured bear oocidia; the cells mentioned in the description as furnished with a large dark-coloured operculum, "occupying nearly half the area," are probably avicularian.

Ibid. (p. 358).

*Smittipora abyssicola*, Smitt.

The genus *Smittipora* is, in my judgment, a synonym of *Onychocella*, Jullien, the differences between the two being quite immaterial.

\* Quart. Journ. Geol. Soc., August 1882, p. 272; *ibid.* February 1887, p. 58.

† From this point to the close of the "Appendix" the paging is that of the 'Annals' and not of the separate copies.

Ibid. (p. 360).

*Microporella Fuegensis*, Busk (sp.).

This is not a *Microporella*, as it wants the suboral pore characteristic of this genus. It is furnished with the peristomial pore, which is a leading character of Busk's *Aleonella*; but this has a totally different structural significance.

As there is considerable doubt about the latter genus, I shall postpone the discussion of the systematic place of the present form.

[To be continued.]

XXV.—*A Reply to some Observations on the Mouth-organs of the Diptera.* By B. THOMPSON LOWNE, F.L.S.

MR. CHARLES O. WATERHOUSE in the January number of this Journal appears to invite me to reply to what, for want of a better term, I may designate a "quip courteous," in which he has availed himself of the saving qualities of an "if."

My critic has, curiously enough, seen more in my book than I ever wrote or intended, and has failed to see what I did write; therefore I avail myself of an "if."

If Mr. Waterhouse had used no more acumen in the interpretation of the mouth-parts of the Diptera than he has brought to bear on the interpretation of what I have said I should not have been surprised that he still holds the old and time-honoured opinions regarding the mandible of the dipterous mouth. I do not, however, for a moment suppose that he reads "Nature" as carelessly as he reads my work; but I think he might have rewarded the "skill and care" which he credits me with by a little more attention before he consigned me to oblivion in the pit of error in some unknown region; for if I have fallen into "some error," the nature of which is not even indicated, my position is no better, and there is small chance that a passing friend may draw me out. Therefore it behoves me to make an effort to save myself.

The main argument I use in favour of the views I have adopted is the manner in which the parts in question are developed. If I have falsely interpreted the appearances relating to their development I am as likely to be wrong as another; therefore the question at issue is: Are the mouth-parts of *Musca* developed as Mr. Lowne states or are they not? There are no side issues to the question.